

in Situ Instruments and Micro ElectroMechanical Systems (MEMS)
for Planetary Science

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Abstract

The study of planetary environments depends on in situ science instruments to provide direct measurements of physical and chemical phenomena on planetary surfaces. Recent development of micro instruments, orders of magnitude smaller than those in conventional use, have enabled new approaches to planetary missions which avoid the traditional size, cost, and complexity of landed missions. An example is the proposed New Millennium Program Mars MicroProbe, a miniature penetrator deployable from space and capable of performing surface and subsurface science. The MicroProbe weighs less than 2 kg when released from the cruise stage. Micro Electromechanical Systems (MEMS) play a key role in miniaturization, not only of sensors, but of spacecraft subsystems including communications, thermal management, inertial guidance, and propulsion. The role of microdevice systems for space exploration and impact on future mission concepts will be discussed.